

### REMARKS

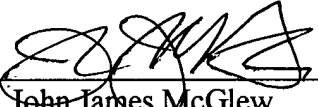
Claims 1 through 18 are in this application and are presented for consideration. Claims 1 through 9 have been amended. The amended claims present the same subject matter as the original claims but have been amended to adapt them to the U. S. style. The new claims present subject matter similar to the original claims, but in a different form.

The specification and claims have been amended in order to place this application in better form. The reference to claims in the specification has been deleted or amended. Appropriate headings have been added. No new matter has been added.

Favorable action on the merits is respectfully requested.

Respectfully submitted  
for Applicant,

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JJM:jj/  
71657.1

Enclosed: Substitute Specification and Marked up copy of Translation

DATED: January 24, 2005  
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BY: *Christina Fonde* DATE: January 24, 2005

DT05 Rec'd PCT/PTO 24 JAN 2005

**(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE  
INTERNATIONAL PATENT COOPERATION TREATY****(19)**—**World Intellectual Property Organization**  
—International Bureau**(43)**—**International Publication Date**  
—**February 19, 2004 (02/19/2004)**—**PCT****(10)**—**International Publication Number**  
—**WO 2004/014680 A1**

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**(51)**—**International Patent Classification<sup>7</sup>: B06J 5/04****(21)**—**International Application Number: PCT/EP2003/006304****(22)**—**International Filing Date:**  
—**June 14, 2003 (06/14/2003)****(25)**—**Language of Filing: German****(26)**—**Language of Publication: German****(30)**—**Priority Data:**  
—**202 11 948.3 August 3, 2002 (08/03/2002) DE****(71)**—**Applicant (for all designated states except the U.S.A.): NOTHELFER GMBH**  
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**Patentabteilung, Am Thyssenhaus 1, 45128 Essen (DE).****(81)**—**Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY,**  
**BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM,**  
**HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,**  
**MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ,**  
**TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.**

~~(84) Designated States (regional):~~ ~~ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).~~

**Published:**

~~=with international Search Report~~

~~For the explanation of the two-letter codes and the other abbreviations, refer to the explanations ("Guidance Notes on Codes and Abbreviations") at the beginning of each regular issue of the PCT-Gazette.~~

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~~(54) Title:~~

Docket #71657

## CONNECTION OF THE EDGES OF FORMED SHEETS

**{figure}**

~~(58) Abstract:~~

### CROSS REFERENCE TO RELATED APPLICATIONS

**[0001]**      This application is a United States National Phase application of International Application PCT/EP2003/006304 and claims the benefit of priority under 35 U.S.C. § 119 of German Application DE 202 11 948.3 filed August 3, 2002, the entire contents of which are

incorporated herein by reference.

## FIELD OF THE INVENTION

[0002] The present invention pertains to a connection of the edges of formed sheets; preferably of a door outer sheet (1) towith a door inner sheet and/or with a connecting sheet (2), wherein the edges of the sheets have at least ~~partly~~partially planar contact ~~surfaces~~ and ~~may~~can be detachably connected towith one another. ~~Provisions are made according~~

## BACKGROUND OF THE INVENTION

[0003] The door outer sheet and the door inner sheet of motor vehicles are usually connected with one another by spot welding, tacking and tacking adhesive, whereby a permanent connection is established, which can usually be detached only by destroying or damaging the door outer sheet. The tacked doors are inserted into the body at the stage of the bodyshell. This makes difficult the current concepts of subcontracting the processing of already painted doors equipped with accessories. The goal is therefore to connect the inner door built up and painted separately with the door outer skin after the painting of the body and the door outer skin and to subsequently connect it with the body.

## SUMMARY OF THE INVENTION

[0004] The basic object of the present invention is therefore to provide a detachable

connection of the edges of such sheets, in which the tacking technique can be done away with.

**[0005]**      According to the present invention for a connection of the edges of formed sheets preferably of a door outer sheet with a door inner sheet and/or with a connecting sheet is provided wherein the edges of the sheets have at least partially planar contact and can be

5      detachably connected with one another. For the areas of the edges of the sheets lying on top of each other to have strips, straps (3) and/or flanges (4) are provided bent inwardly and/or at least in the same direction for the detachable connection of the sheets by means of screw connections (5) and/or clamping strips (7-11).

— CONNECTION OF THE EDGES OF FORMED SHEETS

**Specification:**

5 The present invention pertains to a connection of the edges of formed sheets, preferably of a door for motor vehicles according to the preamble of claim 1.

10 The door outer sheet and the door inner sheet of motor vehicles are usually connected with one another by spot welding, tacking and tacking adhesive, whereby a permanent connection is established, which can usually be detached only by destroying or damaging the door outer sheet. The tacked doors are inserted into the body at the stage of the bodyshell. This makes difficult the current concepts of subcontracting the processing of already painted doors equipped with accessories. The goal is therefore to connect the inner door built up and painted separately with the door outer skin after the painting of the body and the door outer skin and to subsequently connect it with the body.

15 The basic object of the present invention is therefore to propose a detachable connection of the edges of such sheets, in which the tacking technique can be done away with.

This object is accomplished according to patent claim 1. The subclaims 2 through 9 contain meaningful embodiments for this.

Provisions are made according to the present invention for the areas of the edges of the sheets lying on top of each other to have strips, straps and/or flanges bent inwardly and/or at least in the same direction for the detachable connection of the sheets by means of screw connections and/or clamping strips.

[0006] The edges of the sheets may be preferably manufactured by edging and designed such that mounting straps arranged approximately at right angles to the plane of the sheet are present, distributed on the circumference preferably on the door outer skin, and the said mounting straps can be fitted together into the inner sheet at opposite mounting flanges of the inner sheet and/or of a connecting sheet and detachably connected by means of a screw connection. Instead of or also in addition to the screw connection, the straps and flanges of the edges of the sheets may also be surrounded by a U-shaped clamping strip, preferably one made of plastic, which can be attached from the outside. It proved to be favorable in case of the use of clamping strips to have not only straps and flanges distributed on the circumference at the sheet edges, but also bent strips, which extend fully or partially over the circumference of the sheet edges. It is now also possible to use longer clamping strips, which preferably extend over the entire circumference or at least over a large part of the circumference. If these clamping strips have a greater length, they must, of course, be made correspondingly elastic or articulated for adaptation to the contours of



the sheet edges. To stabilize the plastic clamping strip, it proved to be favorable if the plastic clamping strip has an inner metal core, which additionally holds the plastic strip on the connection.

**[0007]** As an alternative or in addition to the screw connection, the clamping strip may also be "clipped" or fixed by means of a clipping device in a common opening in the edges of the sheets.

**[0008]** Besides the two sheet edges and optionally also the plastic clamping strip, the joint sealing can also be screwed by means of the screw connection. As a result, the door outer sheet is connected with both the door inner sheet or with a connecting sheet and the joint sealing. However, the joint sealing may also be integrated in the plastic clamping strip such that both are permanently connected with one another already at the time of the manufacture. In this case, the joint sealing does not need to be directly included in the screw connection any longer.

**[0009]** Finally, it also proved to be favorable to design the clamping strips such that they act as cover strips at the same time and even assume the outer sealing function itself. These cover strips can then be brought into contact with the door outer sheet in a suitable manner, e.g., elastically, and be in contact on the other side, e.g., with the glass or the rocker panel.

**[0010]** The connection according to the present invention has the following advantages:

- Elimination of the tacking unit,
- the new concept of the separate painting of the door outer skin and the inner door can be applied,
- 5 -a connecting sheet may be bonded, soldered or welded to the door inner sheet or permanently connected with same in another manner, i.e., no screw connection is necessary, because the connecting sheet and the door outer skin are detachably connected with one another,
- the outer skin, which is removable as an individual part, offers increased repair-
- 10 friendliness, and
- joint sealings can be integrated in cover profiles and clamping strips in a simple manner.

**[0011]** The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses,  
15 reference is made to the accompanying drawings and descriptive matter in which preferred embodiments of the invention are illustrated.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0012]** The present invention will be explained in greater detail below as an example on

the basis of Figures 1 through 8 attached. In the drawings;

**[0013]** Figure 1——~~shows~~ is the view of a locally screwed outer skin 1 in the area of the C pillar of a passenger car;

**[0014]** Figure 2——~~shows~~ is an enlarged detail "x" X from Figure 1;

5 **[0015]** Figure 3——~~shows~~ is the edge connection of a locally screwed outer skin 1 in the area of the C pillar;

**[0016]** Figure 4——~~shows~~ is an arrangement corresponding to that in Figure 3 with a clamping strip 8 and joint sealing 13 integrated in the clamping strip;

**[0017]** Figure 5——~~shows~~ is an arrangement corresponding to Figure 3 with a  
10 clamping strip 7 and joint sealing 12 integrated in the clamping strip for the area of a B column;

**[0018]** Figure 6——~~shows is~~ a connection from the area of the window channel with a clamping and cover strip 9 with integrated metal core 15 (without screw connection);

**[0019]** Figure 7——~~shows is~~ a connection with a clamping and cover strip 10 with integrated metal core 16 and an outer sealing 17 made integrally in one piece for the area of the  
5 rocker panel of a door;; and

**[0020]** Figure 8——~~shows is~~ a connection of a clipped clamping and cover strip 11 with an outer sealing 18 made integrally in one piece, likewise in the area of a rocker panel of a door.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0021]** Referring to the drawings in particular, Figure 1 shows the arrangement of various mounting straps 3 on a door outer skin 1, ~~which are connected with one another with the.~~ The corresponding mounting flanges 4 of a connecting sheet 2 and the corresponding straps 3 on the door outer skin 1 are connected with one another with by a screw connection 5 shown in Figure 3. A sealing adhesive 6 is introduced in the area of the planar contact to seal the door outer skin 1 and the connecting sheet 2.

**[0022]** Compared to Figure 3, Figure 4 shows a U-shaped clamping strip 8 ~~is additionally~~ placed ~~in Figure 4~~ on the bent edges of the sheets 1 and 2 and rigidly connected with the screw connection 5. The joint sealing 13 ~~was~~is rigidly connected with the plastic clamping strip 8 ~~already~~ at the time of the manufacture thereof or it~~joint sealing 13~~ may be connected with it~~the plastic clamping strip 8~~ later. The broken line 21 in Figure 4 indicates the adjoining contour of the C pillar, which is pressed by the joint sealing 13 with the door closed.

**[0023]** Figure 5 shows the adjoining B pillar, designated by reference number 20, with which the joint sealing 12 is in contact. In addition, the clamping strip 7 with the integrated joint sealing 12 is connected in Figure 5 with the edges of the sheets 1 and 2 by means of a screw connection. A sealing adhesive 6 is in turn present between the two sheets 1, 2 for additional sealing.

**[0024]** The screw connection 5 has been eliminated in Figures 6 through 8. The clamping strips 9 and 10 have, instead, an integrated metal core 15, 16 in Figures 6 and 7, and the edges of the sheets 1 and 2 are held together by means of the ~~said~~ metal core. In addition, the outer edge of the sheet 1 is bent in Figure 6 to the extent that it slightly surrounds the outer edge. At the same time, the bent outermost edge 22 of the sheet 1 may act as a retaining means for the clamping strip 9. The bent outer edge 23 of the sheet 2 may similarly act according to Figure 7 as a retaining means for the clamping strip 10. As is apparent from Figure 6, the clamping strip 9

additionally has elastic sealing lips, which are in contact with the pane 14.

**[0025]** Outer sealings 17 and 18, which come into contact with the door sill, not shown, are present in Figures 7 and 8.

**[0026]** According to Figure 8, the clamping strip 11 is held at the bent edges of the sheets 1 and 2 by means of the clipping device 19, so that retaining means similar to that for the edges 22 and 23 according to Figures 6 and 7 can be eliminated.

**List of Reference Numbers:**

†——Door

**[0027]**      While specific embodiments of the invention have been shown and described in detail to illustrate the application of the principles of the invention, it will be understood that the invention may be embodied otherwise without departing from such principles.

## ABSTRACT OF THE DISCLOSURE

A connection of the edges of formed sheets, preferably of a door outer sheet (1) to a door outer skin)

2——Connecting sheet

3——Mounting strap on 1

4——Mounting flange on 2

5——Screw connection

6——Sealing adhesive

7——Clamping strip

8——Clamping strip with integrated joint sealing 13

9——Clamping and cover strip with integrated metal core 15

10——Clamping and cover strip with integrated metal core 16 and outer sealing 17

11——Clamping and cover strip with outer sealing 18

12——Joint sealing

13——Joint sealing on 8

14——Glass

15——Metal core in 9

16——Metal core in 10

17——Outer sealing on 10

18——Outer sealing on 11

19——Clipping device for 11

20——B pillar



21——C pillar

22——Edge for t

23——Edge for 2 inner sheet and/or a connecting sheet (2) is provided, wherein the edges of the sheets have at least partly planar contact surfaces and may be detachably connected to one another. Provisions are made for the areas of the edges of the sheets lying on top of each other to have strips, straps (3) and/or flanges (4) bent inwardly and/or at least in the same direction for the detachable connection of the sheets by means of screw connections (5) and/or clamping strips (7-11).